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EXAMINER

CHANG, EDITH M

ART UNIT	PAPER NUMBER
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2634

5

DATE MAILED: 02/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/725,532

Applicant(s)

MIYAMOTO ET AL.

Examiner

Edith M Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/nov 29 2000.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The spacing of the lines of the specification is such as to make reading and entry of amendments difficult. New application papers with lines double spaced on good quality paper are required.

The spacing of the lines of the specification needs to be doubled.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore,

Claim 14, the “anti-phase splitter, which splits input subsignals into third and fourth subsignals of opposite phases”, and “an in-phase combiner, which combines in the same phase said third subsignal after amplitude adjustment and said fourth subsignal after delay” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim 17, the “a common multi-phase splitter” in “and said anti-phase splitter, which splits subsignals of the input into third and fourth subsignals having mutually opposite phases, are formed by a common multi-phase splitter”. The common multi-phase splitter will split the input signal into three subsignals with the phase as cited in the claim must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim 21, at least one of the first and second amplitude adjuster that are able to adjust the amplitudes of the first and second subsignals from the orthogonal splitter comprises: “a splitter,

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which splits the input signals into first, second and third subsignals” must be shown or the features canceled from the claims. No new matter should be entered.

Claim 26, “a splitter”, which splits the input signals into mutually orthogonal first and second subsignals and a third subsignal, which has freely selected phase and is in opposite quadrant of said first and second subsignals, “a delay device” delays said third subsignal, “third and fourth amplitude adjusters”, which are able to adjust the amplitudes of said first and second subsignals; and an “in-phase combiner”, which combines said first and second subsignals and said third subsignal after delay must be shown or the features canceled from the claims. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. The claims 1-32 are objected to because the lines are crowded too closely together, making reading and entry of amendments difficult. Substitute claims with lines one and one-half or double spaced on good quality paper are required. See 37 CFR 1.52(b).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 6, and 13-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim 6 inheres the limitations of claim 1 where the second signal splits into mutually orthogonal first and second subsignals, however in the claim 6 wherein said second signal is split into mutually in-phase first, second subsignal. The first and second subsignals can not be defined as mutually orthogonal or mutually in-phase.

Claim 17, the term “the split signal” in “which splits the split signal into mutually orthogonal first and second subsignals” lacks antecedence;

recites the limitation “the input” in “which splits subsignals of the input into third and fourth subsignals having mutually opposite phases” is failing to indicate which “input” that subsignals split from.

Claim 26 recites the limitation “said first and second subsignals” in “which has a freely selected phase and is in the opposite quadrant of said first and second subsignal”, the “said first and second subsignals” is indefinite to particularly point out which first and second subsignals generated by the splitter of the amplitude adjuster of this claim or generated by the splitter of the parent claim 14;

the “said first and second subsignals” in “third and fourth amplitude adjusters, which are able to adjust the amplitudes of said first and second subsignals” is indefinite to particularly point out which first and second subsignals generated by the splitter of the amplitude adjuster of this claim or generated by the splitter of the parent claim 14.

Claims 13 and 14 recite the limitation "the other signal" in "the antiphase of the other signal"; "the input signal component" in "cancels the input signal component"; and "these signals" in "by recombining these signals". There are insufficient antecedent bases for these limitations in the claim.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 1, 3-7, 13, 15-22, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gentzler (US 6046635) in view of Isobe et al. (US 4584712) and Leizerovich et al. (US 5880633).

Regarding **claims 1, 13, & 29**, except specify (1) splitting a signal (90 degree/orthogonal) into orthogonal subsignals and (2) a separated amplitude adjuster, Gentzler discloses a signal cancellation device/a feed-forward amplifier and its method (FIG. 12 is the pre-stage distortion extraction loop, 16 is the post-stage distortion loop, column 1 lines 5-15) comprising the splitter of splitting (22 FIG. 1 is the splitter) an input signal into a first and second signal (20 is the input signal, 24-26-28-78 FIG. 1 is the first signal, 36 FIG. 1 is the second signal), and a splitter to split (38 FIG. 1 is the splitter) the second signal into first and second subsignals (46 and 38-40 FIG. 1 are the first and second subsignals), and a recombiner to recombine (70 FIG. 1) the first and second subsignals after respective amplitudes thereof have been adjusted by first and second

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amplitude adjusters (66-68 are amplitude adjusters for the first and second subsignals), forming a third signal (74 FIG.1 is the third signal), and canceling the first signal (78 FIG.1 is the first signal) by the third signal thereby obtained (Abstract).

With respect to item (1) orthogonal splitter, Isobe et al. teaches the 90 degrees splitter (25 FIG.6, column 3 lines 25-27) splitting the second signal into subsignals (22-25 FIG.6 and 23-31 FIG.6 are the second and first signals) to suppress an interference signal (Abstract, FIG.1-5, column 1 line 38-column 2 line 7). As Gentzler splitting the second signal to subsignals, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the orthogonal splitting taught by Isobe et al. implemented in the Gentzler's splitter 38 to eliminate the interference signals (column 2 lines 10-13).

With respect to item (2) separated amplitude adjuster, Leizerovich et al. teaches a second amplitude adjuster for the second subsignal (74/76 FIG.6, where the 72 is a splitter, 78 is a combiner). As Gentzler adjusting the subsignals, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the amplitude adjuster for each subsignal taught by Leizerovich et al. to have a high efficiency amplifier (Abstract, column 1 lines 4-7) to reach the same effect as Gentzler's amplitude adjusters arrangement.

Regarding **claims 3 & 4**, Gentzler discloses at least one of the first and second subsignals (38-40 FIG.1 is one of the subsignal) is split into third and fourth subsignals (44 and 42 FIG.1 are the third and fourth subsignals), the fourth subsignal is delayed (48 FIG.1 is delay), and after the amplitude of the third subsignal has been adjusted (52-60 FIG.1 is the amplitude adjuster), it is recombined by the comparison circuit (50 FIG.1, column 4 line 44, where 50 is the

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comparison circuit combining signals in antiphase that is equivalent to combine two mutually opposite phase signals) with the fourth subsignal after the delay.

Regarding **claim 5**, Gentzler discloses the third subsignal having a freely selected phase and is delayed (42-48 FIG. 1), the first and second subsignals have been adjusted, are recombined with the delayed third subsignal with antiphase (the third subsignal is subtracting in 50 comparison circuit 50 FIG. 1, that it is antiphase).

Regarding **claim 6**, Gentzler discloses the second signal is split into in-phase first, second and third subsignals (FIG. 1 46, 42-48, and 44 are three subsignals, where 46 is the third subsignal), and third subsignal is delayed (FIG. 1 46 is delayed), the first and second subsignals after amplitude adjustment are combined in orthogonal phase (62-50 is the orthogonal combiner where the PHASE 62 adjust the phase) and the third subsignal after the delay is combined in a freely selected phase (68-70 FIG. 1 combines the third subsignal, where PHASE 68 adjusts the phase).

Regarding **claim 7**, Gentzler discloses a first adjustment process, whereby the amplitude of the first subsignal is adjusted and the amplitude of the output signal at this time is minimized or reduced (206 FIG. 2), and a second adjustment process, whereby the amplitude of the second subsignal is adjusted (218 FIG. 2), are alternately performed in repetition (224 FIG. 2).

Regarding **claim 15**, Gentzler discloses the amplitude adjuster is able to reverse its output signal in positive phase or reverse phase (66-68 FIG. 1).

Regarding **claim 16**, Gentzler discloses the amplitude adjuster comprising: an antiphase splitter (40-62 FIG. 1 splits the signals into antiphase subsignals with the phase adjuster 62,

where the subsignal on 42 and 40-62 have opposite phases); a delay device (48 FIG.1); an amplitude adjuster (52-60 FIG.1); and an in-phase combiner (62-50 FIG.1).

Regarding **claims 17 & 19**, Gentzler discloses a common multi-phase splitter (40-62 FIG.1 where the phase adjuster provides the multi-phase).

Regarding **claim 18**, Gentzler discloses the amplitude adjuster provided with: an in-phase splitter (40 FIG.1 splits the signals into subsignals, the subsignals on 42 and 44); a delay device (48 FIG.1); an amplitude adjuster (52-60 FIG.1); and an anti-phase combiner (50 FIG.1, the comparison circuit).

Regarding **claim 20**, inheres the limitations of claim 13, Gentzler discloses a splitter (38-40 FIG.1), which splits the input signals into mutually orthogonal first and second subsignals (38-60, 38-40 FIG.1 are the first and second subsignals mutually orthogonal/with the orthogonal splitter taught by Isobe et al., refer to the rationale of claim 13) and a third subsignal having a freely selected phase (signal on 38-46 is the third subsignal); a delay device delaying the third subsignal (46 FIG.1); third and fourth amplitude adjusters (52-60 FIG.1 is the amplitude adjuster for both subsignals/with the Leizerovich et al.'s teaching refer to the rationale of claim 13); and an in-phase combiner (70 FIG.1).

Regarding **claim 21**, Gentzler discloses a splitter (38-40 FIG.1) in at least one of the first and second amplitude adjuster (38-40-68 FIG.1 is the amplitude adjuster), which splits the input signals into first, second and third subsignals s (38-60, 38-40 FIG.1 are the first and second subsignals, signal on 38-46 is the third subsignal); a delay device delaying the third subsignal (46 FIG.1); third and fourth amplitude adjusters (52-60 FIG.1 is the amplitude adjuster for both subsignals/with the Leizerovich et al.'s teaching refer to the rationale of claim 13); and combiner

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(70 FIG.1), however does not specify a separate amplitude adjuster. Leizerovich et al. teaches a second amplitude adjuster for the second subsignal (74/76 FIG.6, where the 72 is a splitter, 78 is a combiner). As Gentzler adjusting the subsignals, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the amplitude adjuster for each subsignal taught by Leizerovich et al. to have a high efficiency amplifier (Abstract, column 1 lines 4-7).

Regarding **claim 22**, Gentzler teaches an automatic controller (90 FIG.1, FIG.2) which alternately and repetitively performs a first adjustment process (206 FIG.2), where by the amplitude of the output signal at this time is minimized or reduced by controlling a first amplitude adjuster, and a second adjustment process (218 FIG.2), where by the amplitude of the output signal at this time is minimized or reduced by controlling a second amplitude adjuster, are alternately performed in repetition (224 FIG.2).

Regarding **claim 31**, Gentzler discloses a next-stage splitter (40 FIG.1), which splits a portion of the output of the pre-stage amplifier, and a pre-stage combiner (50 FIG.1), which synthesizes the split signals and the delay signals of the pre-stage.

8. Claims 2, 8-12, 14, 23-25, 27-28, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gentzler (US 6046635) in view of Watanabe et al. (US 5046133) and Leizerovich et al. (US 5880633).

Regarding **claims 2, 14, & 30**, except specify (1) the combining degree (90 degree/orthogonal) and (2) a separate amplitude adjuster, Gentzler discloses a signal cancellation device/a feed-forward amplifier and its method (FIG.1, 12 is the pre-stage distortion extraction

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loop, 16 is the post-stage distortion loop) comprising the splitter of splitting (22 FIG.1) an input signal into a first and second signal (24-26-28 FIG.1 is the first signal, 36 FIG.1 is the second signal), and splitting (38 FIG.1) the second signal into the first and the second subsignals (46 and 38-40 FIG.1 are the first and second subsignals), and recombiner to recombine (70 FIG.1) the first and second subsignals after respective amplitudes thereof have been adjusted by first and second amplitude adjusters (52-60-62-66-68 are amplitude adjusters for the first and second subsignals), forming a third signal (74 FIG.1 is the third signal), and canceling the first signal by the third signal thereby obtained (Abstract). However Watanabe et al. teaches the 90 degree combiner (345 FIG.14, column 17 lines 30-55). As Gentzler using a phase shifter (62 FIG.1) and a combiner (50 FIG.1), at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the orthogonal combiner taught by Watanabe et al. as the Gentzler's phase shifter and combiner to extract the interference signal and eliminate the interference (column 17 lines 52-54, Abstract).

Regarding **claims 8 & 9**, Gentzler discloses at least one of the first and second subsignals (38-40 FIG.1 is one of the subsignal) is split into third and fourth subsignals (44 and 42 FIG.1 are the third and fourth subsignals), the fourth subsignal is delayed (48 FIG.1 is delay), and after the amplitude of the third subsignal has been adjusted (52-60 FIG.1 is the amplitude adjuster), it is recombined by the comparison circuit (50 FIG.1, column 4 line 44, where 50 is the comparison circuit combining signals in antiphase that is equivalent to combine two mutually opposite phase signals) with the fourth subsignal after the delay.

Regarding **claim 10**, Gentzler discloses the third subsignal having a freely selected phase and is delayed (42-48 FIG.1), the first and second subsignals have been adjusted, are recombined

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with the delayed third subsignal with antiphase (the third subsignal is subtracting in 50 comparison circuit 50 FIG.1, that it is antiphase).

Regarding **claim 11**, Gentzler discloses the second signals is split into in-phase first, second, and third subsignals (38-40 FIG.1 is the splitter splits signal into subsignals on 46, 42, and 44 which are the three subsignals), the third subsignal is delayed (46 FIG.1 delay the third subsignal), and first and second subsignals after amplitude adjustment are recombined and the third subsignal after the delay is combined in a freely selected phase, however does not specify the orthogonal combiner, Watanabe et al. teaches the 90 degree combiner (345 FIG.14, column 17 lines 30-55). As Gentzler using a phase shifter (62 FIG.1) and a combiner (50 FIG.1), at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the combiner taught by Watanabe et al. to extract the interference signal and eliminate the interference (column 17 lines 52-54, Abstract).

Regarding **claim 12**, Gentzler discloses a first adjustment process, whereby the amplitude of the first subsignal is adjusted and the amplitude of the output signal at this time is minimized or reduced (206 FIG.2), and a second adjustment process, whereby the amplitude of the second subsignal is adjusted (218 FIG.2), are alternately performed in repetition (224 FIG.2).

Regarding **claim 23**, Gentzler discloses the amplitude adjuster is able to reverse its output signal in positive phase or reverse phase (66-68 FIG.1).

Regarding **claim 24**, Gentzler discloses the amplitude adjuster comprising: an antiphase splitter (40-62 FIG.1 splits the singals into antiphase subsignals with the phase adjuster 62, where the subsignal on 42 and 40-62 have opposite phases); a delay device (48 FIG.1); an amplitude adjuster (52-60 FIG.1); and an in-phase combiner (62-50 FIG.1).

Regarding **claim 25**, Gentzler discloses the amplitude adjuster provided with: an in-phase splitter (40 FIG.1 splits the signals into subsignals, the subsignals on 42 and 44); a delay device (48 FIG.1); an amplitude adjuster (52-60 FIG.1); and an anti-phase combiner (50 FIG.1, the comparison circuit).

Regarding **claim 27**, Gentzler discloses a splitter (38-40 FIG.1) in at least one of the first and second amplitude adjuster (38-40-68 FIG.1 is the amplitude adjuster), which splits the input signals into first, second and third subsignals s (38-60, 38-40 FIG.1 are the first and second subsignals, signal on 38-46 is the third subsignal); a delay device delaying the third subsignal (46 FIG.1); third and fourth amplitude adjusters (52-60 FIG.1 is the amplitude adjuster for both subsignals/with the Leizerovich et al.'s teaching refer to the rationale of claim 13); and combiner (70 FIG.1), however does not specify a separate amplitude adjuster. Leizerovich et al. teaches a second amplitude adjuster for the second subsignal (74/76 FIG.6, where the 72 is a splitter, 78 is a combiner). As Gentzler adjusting the subsignals, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the amplitude adjuster for each subsignal taught by Leizerovich et al. to have a high efficiency amplifier (Abstract, column 1 lines 4-7).

Regarding **claim 28**, Gentzler teaches an automatic controller (90 FIG.1, FIG.2) which alternately and repetitively performs a first adjustment process (206 FIG.2), where by the amplitude of the output signal at this time is minimized or reduced by controlling a first amplitude adjuster, and a second adjustment process (218 FIG.2), where by the amplitude of the output signal at this time is minimized or reduced by controlling a second amplitude adjuster, are alternately performed in repetition (224 FIG.2).

Regarding **claim 32**, Gentzler discloses a next-stage splitter (40 FIG.1), which splits a portion of the output of the pre-stage amplifier, and a pre-stage combiner (50 FIG.1), which synthesizes the split signals and the delay signals of the pre-stage.


Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 703-305-3416. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
January 31, 2004


CHIEH M. FAN
PRIMARY EXAMINER